~~SECRET~~

Chief, St/PR 25 May 1956

THRU : Chief, D/E
Chief, S/COM

Transmittal of Project S-60, Sabotage of Communications Systems

Transmitted herewith are copies of project, subject as above, completed by [redacted] A total of 7 manhours were used in completing the project. 25X1A9a

[redacted] 25X1A9a

~~SECRET~~

Approved For Release 2000/08/26 : CIA-RDP61S00527A000200130083-1

Sabotage of Communications Systems

1. The mode of operation of a communication system must be understood by a saboteur before he can determine the point or points at which sabotage can be applied to produce the desired result. For example, without the knowledge of the over-all operating plan of a system, he might disrupt a relatively unimportant station of that system in an effort to disrupt the entire system. On the other hand, disruption of a key station would prevent the entire system from functioning although this might involve a greater risk. It is the purpose of this section to acquaint the saboteur with the basic operating plans of the communications systems and the means of identifying them. At the same time, it is possible to point out the most vulnerable points where sabotage may be applied to cause the maximum disruption of service.

Specific Sabotage Attack (Equipment External to the Station Housing)

2. Supporting Structures: The supporting structures of all overhead wire or cable circuits are vulnerable external elements of a communications system. Any action that will cause one or more of these structures to collapse will be effective. The cutting of guy wires is no doubt the simplest means of producing misalignment of the supporting members. The most critical structures in this respect are the ones that take the strain caused by a change in direction of the wire lines, such as at curves or at right angle bends. This is also true of the structures at either side of a span of wire crossing a body of water or a deep valley.

Sabotage of Structures: For immediate action, cut guy wires or break insulators in the guy wires of key or critical supporting structures.

For delayed action, loosen clamps and other hardware used to fasten guy wires.

Wire Circuits: The most obvious sabotage is to cut the communication wire either at a pole or on the ground. A more subtle means, however, would be to cause the copper wire to be eaten through by the application of sulfuric or nitric acid to the bare wire. Insulators that have been broken on several adjacent poles on a given wire circuit will permit the wires to become tangled with other paralleling wires of other circuits. A length of bare wire or any conducting material, thrown over a number of bare open wire communication circuits, will cause a short-circuit and render the system inoperative. Rope, first soaked in salt water and dried, becomes a conductor when it is exposed to rain. Any kinked or notched wire will fail, in time, if it is under varying tension such as would be caused by high winds or extreme changes in temperature.

Sabotage of Wire Circuits: For immediate action, cut or short-circuit wires to ground. To short and create interference in communications circuits, shoot down insulators supporting adjacent power transmission lines. Shoot down communication line insulators. Cause accidents, such as train wrecks, along rights of way where heavy pole lines run, especially at bottleneck points. If the wreck can demolish an adjacent repeater station, so much the better.

For delayed action, apply a strong acid on exposed metal of communication wire; if insulated, puncture the insulation to the conductor and apply acid at the points of puncture. Apply acid around any terminals to which the wires are attached. Twist a sharp kink, or notch any communication wire which is or will be under tension.

Cable Circuits: The disruption of circuits in any cable may be brought about by permitting moisture to penetrate the cable covering. A cut or break in the cable covering may be encouraged by causing localized stresses at a nick or a cut at points where the cable bends. Sulfuric acid will eat holes in lead covered cable and permit moisture to enter the cable. Under emergency conditions the cable may be cut or a shot may be fired through the covering to permit moisture penetration. The hanger hardware and messenger wire of aerial cable are vital in supporting the cable, any failure of this hardware or messenger wire will cause the cable to break under its own weight. Underground cable is vulnerable at splices, usually in a manhole.

Sabotage of Cable Circuits: For immediate action, cut messenger wire carrying communication cables. Drop a hand grenade, thermite bomb or like device into manhole containing underground cabled. Accidents, as discussed under Sabotage of Wire Circuits, may also be useful in causing disruption of cable circuits.

For delayed action, cut a deep gash through the protective covering and apply acid, or let the cut be exposed to the elements. If the cable is not readily accessible, shoot a hole through it. Flooding may be useful on underground circuits after the cable has been cut or a hole has been shot through it.

Twisted Pair and Wires on the Ground: Twisted pair can be cut most readily at obscure points, preferably by cutting one wire and not both wires at a given point. This increases the difficulty of locating the fault. Wires lying on the ground can easily be crushed with aid of two stones to expose the bare wires. These wires may then be arranged to lie in a depression in the ground, thus insuring effective shorting of the wires at the first rainfall. In emergencies, wires on the ground may be cut. Always being careful to conceal the break under a stone or a clump of dirt. The cut may be made from the underside of the wires.

Sabotage of Twisted Pair and Wires on the Ground: For immediate action, wires should be cut, and the cut concealed as described above. Straight pins can be used to short the two conductors of a twisted pair. Care should be taken to insure that the pin contacts the conductors. The pins should be inserted at irregular intervals along the line.

For delayed action, the insulation on all wires should be punctured and either acid applied or the damaged section of wire arranged to lie in a depression in the ground. This will cause the wires to be short circuited under water at the first rainfall.

Entrance Cables: Many of the circuits carried on poles or on the ground are brought into the terminals through drops or entrance cables. These circuits are subject to the same sabotage treatment as other wire or cable. All cuts and punctures should be made in a position that will not be conspicuous.

Power Lines: Power lines often are carried on the same poles as the communications lines. Severe interference in the communication lines may result if a power line insulator becomes damaged or one of the power lines becomes grounded. Likewise, interference may result if one of the wires of a communication circuit becomes grounded because of a failure of a communication line insulator.

Radio Antenna: The most accessible point of an antenna is usually the lead-in or the wire leading from the antenna proper into the terminal equipment. A break in or a ground connection to the lead-in will greatly reduce the effectiveness of the antenna. The antenna lead-in may be grounded by causing a failure of one or more of the insulators that insulate the lead-in at the point where it enters the equipment housing. This act of sabotage would be particularly effective on high-powered transmitting stations.

Almost complete disruption of service results when the supporting structure of large antenna fails. This action would be detected immediately and would be difficult to accomplish unnoticed. The weakening or the cutting of any main supporting members in a large structure may cause a complete failure under a high wind. In the case of directional antennae, correct orientation is of utmost importance, since the radiated beam may be of the order of 10 to 20

degrees or less in width. A slight distortion in the supporting structure for such antenna would cause the radiated beam to "miss" its distant station or target.

Practically all antenna are insulated from the ground or the supporting structure by one or more insulators. An exception to this is a micro-wave antenna. The insulators may support the entire weight of the antenna and are therefore under considerable stress. A very effective means of causing their failure is to shoot them down. Antenna used in commercial broadcasting consist of a high tower (several hundred feet high) supported at its base and insulated from ground at its foundation by one or more insulators. A failure of one insulator at the base may cause complete collapse of the tower. Antenna supported on a single insulator are guyed in several directions. The tower may be caused to fail by cutting one or more of the guy wires. These guy wires are also insulated from ground with insulators that may be shot down.

Sabotage of Radio Antenna: The insulators supporting the antenna should be fractured by shooting down, if necessary. If these insulators are inaccessible, the insulators supporting the lead-in from the antenna to the station should be damaged in any manner possible. The main supporting structure should be weakened to the point of failure by cutting guy wires, fracturing guy wire insulators, cutting key structural members or by loosening structural hardware. If the antenna is of the directional micro-wave variety, it will

not be necessary to demolish the supporting structure completely in order to affect operation seriously. Distortion caused by a 20-degree twist about the vertical axis will be sufficient. If the antenna is supported by wooden poles, setting fire to dry grass in the antenna field may help in weakening the poles and cause a collapse of the antenna system.

Facilities Internal to Station:

Alarm Systems: Before sabotage, disable all alarm systems associated with equipment to be attacked. This can be done most readily by blocking the indicator device in the normal "no-alarm" position.

Power Sources: The facilities include transmission lines and sub-stations and gasoline or oil-powered generator units. Low-powered units may be batteries, either storage or dry cell types. For immediate action against storage batteries, the case containing the acid electrolyte should be broken or cracked on a cell near the center of the bank of cells. The connections made to the lead terminals should be well loosened but not removed.

Telephone Equipment: For immediate action, cut vital wire circuits and physically destroy switchboards or automatic switching mechanisms. Microphones and receivers or head-sets can be made inoperative by damaging the delicate diaphragms inside the units. For a delayed action in an automatic switching station release a conducting dust or a corrosive gas or vapor in the room with the automatic equipment.

Telegraph and Teleprinter: For immediate effect cause physical damage to the working parts of the instruments.

Vacuum Tube Equipment: For immediate action against high-powered equipment, damage glass tubes by throwing cold water on them while hot or by breaking the glass seals. Produce arc-over at high voltage insulating bushings of condensers by breaking insulators or by partially smearing over the insulators with iron or carbon dust mixed with greases. Disable overload protection equipment first. Exercise care, since voltages being dealt with may be fatal.

Low powered equipment (equipment using small tubes) may be sabotaged by interchanging tubes with like bases and unlike type numbers. Short circuit insulated terminals of condensers with a small wire. Alter all equipment adjustments that can be reached. If possible, force the adjustments beyond their normal limits. Loosen coupling connectors on the equipment and interchange or sever them whenever possible.

For delayed action against all equipment, apply hydrofluoric acid to the glass tube envelopes or nitric acid to the metal tube parts. Apply acid to capacitor cases or puncture them with a small sharp tool.

Sabotage Techniques in the Manufacture of Comms Equipment

The vital and most widely used components in the manufacture of communications equipment are: (1) Solder; (2) resistors; (3) capacitors; and (4) vacuum tubes. Sabotage that should be applied to these components for effective action, to take effect at a future time, consists of introducing faults or using contaminants that are to be added at suitable stages during the manufacture of the component. This same procedure can be used with respect to wire or cable manufacturing.

Conclusions

The conclusions from the foregoing general analysis are as follows: From the sabotage standpoint, the most accessible parts of an existing communication system are the facilities external to the terminal communication equipment. These facilities include the inter-connecting wire or cable circuits between key communication stations (in the case of wire communication), and radio antenna of key radio stations (in the case of radio communication). Faults or failures of external facilities are not easily located or repaired, and replacements of these items are not likely to be available.

The terminal equipment can be sabotaged. However, except for complete destruction of the terminal, such treatment may not be effective, since replacement units may readily be put into service by trained personnel available at the terminal locations.

Sabotage of the facilities external to the communication terminals permits either a timed occurrence at a particular place or an untimed occurrence at one or more places depending upon the form of attack used.

The most effective sabotage that can be applied to the manufacture of communication equipment is through attack techniques applied to particularly vital and widely-used components in the equipment. Such sabotage consists of using contaminants, introduced during the manufacture of the particular components, which cause a gradual deterioration of the component after some use. Manufacturing does not present

an opportunity for a direct attack or for sabotage with immediate effect, because of the many quality and performance inspections made during the manufacture and final test of communication equipment. Therefore, sabotage must be such as to take effect after the final inspection.